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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 04 1998

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Excluding HFC-227ea from EPA's definition of volatile organic chemicals under 40 CFR 51.100 (s)

FROM: Paul M. Stolpman, Director
Office of Atmospheric Programs (OAP)

TO: John Sietz, Director
Office of Air Quality Planning and Standards (OAQPS)

In a February 18, 1998 letter to you, Robert Campbell of Great Lakes Chemical Corporation requested that the Environmental Protection Agency (EPA) exclude HFC-227ea from the definition of a volatile organic chemical (VOC) under 40 CFR 51.100 (s). I am writing to encourage an expeditious review of their request given the importance of the compound in efforts to protect stratospheric ozone.

HFC 227ea has been approved for use as a substitute for ozone depleting substances under EPA's Significant New Alternatives Program (SNAP) in key applications such as fire suppression and refrigeration. HFC 227ea is also being considered to replace chlorofluorocarbons (CFCs) in ethylene oxide sterilants. More importantly, the Food and Drug Administration (FDA) has indicated that HFC 227ea can be a viable substitute for CFCs in metered dose inhalers (MDIs), which are used to treat asthma and chronic obstructive pulmonary disease. Over the last several years, the pharmaceutical industry has been making significant progress in reformulating MDIs with non-ozone depleting chemicals. Part of this progress has been overcoming the challenge of finding substitute chemical propellants which react favorably with the drug molecules and other substances contained in MDIs. Studies undertaken by the pharmaceutical industry suggest that HFC-227ea could be an effective substitute propellant in MDIs; exempting HFC-227ea from the VOC definition will allow the pharmaceutical industry to continue plans for reformulating MDIs using this chemical.

It is my understanding that studies of HCF-227ea confirm that the compound meets the requirements for exclusion from EPA's VOC definition - - the substance must be no more reactive than ethane in generating ozone. Further, it is my understanding that OAQPS is considering

revisions to the reactivity policy which could include a moratorium on reviewing VOC exclusions as early as this spring. Given the importance of the use of HFC-227ea to several industries, we would encourage the expeditious review of Great Lakes' request prior to any possible moratorium on such reviews.

Thank you for your consideration of the matter. Should you or your staff have questions regarding HCF-227ea and its approval under OAP's SNAP program, please do not hesitate to contact Reva Rubenstein of my office at 202/564-9155.

Great Lakes
Chemical Corporation

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John Seitz (MD-10)
US Environmental Protection Agency
Office of Air Quality Standards
Research Triangle Park, NC 27711

February 18, 1998

RE: Excluding HFC-227ea (1,1,1,2,3,3,3-heptafluoropropane) from EPA's VOC definition

Dear John,

Great Lakes Chemical Corporation, a manufacturer of HFC-227ea, requests that the EPA amend its definition of VOC at 40 CFR 51.100(s) to exclude HFC-227ea from the definition of a VOC. The atmospheric chemistry and toxicology of this substance has been thoroughly reviewed by the Office of Air and Radiation under the EPA's Significant New Alternatives Program (SNAP). This substance that has been approved under EPA's SNAP program as an acceptable substitute for Halon 1301 and Halon 1211 in various fire suppression applications. It is also being considered by the FDA for use in metered dose inhalers (MDI's) as an alternative for CFC-12 and by the EPA under FIFRA for use as an alternative to CFC-12 in ethylene oxide sterilants. SNAP decisions on these uses are pending these regulatory approvals.

Under EPA's current approach to excluding compounds from the VOC definition, substances which have been shown to be no more reactive than ethane in generating ozone are considered "negligibly reactive". A compound's rate constant for the reaction with the OH radical has been the key measure used by the EPA to compare the photochemical reactivity of compounds relative to ethane. Nelson, et al reported the rate constant for the reaction of HFC-227ea with the OH radical in the Geophysical Research Letters, Vol. 20, No. 2, pages 197-200, February 5, 1993 (reprint enclosed). This constant was based on studies performed in the laboratories of Aerodyne Research, Inc. The rate constant reported in this paper was 1.09×10^{-15} cm^3 /molecule/ sec at 277K (0°C). This corresponds to a rate coefficient of 1.64×10^{-15} cm^3/molecule/sec at 21°C (298°K). By comparison, ethane's reactivity is over two orders of magnitude higher (2.4×10^{-13} cm^3/molecule/sec). The coefficient of several other HFC's which have been added to the list of "non-VOC" substances have OH reaction rate constants higher than HFC-227ea's constant as well.

Consequently, it is clear that HFC-227ea is negligibly reactive in comparison to ethane and other substances that have already been excluded from the VOC definition. Therefore HFC-227ea can be included with the list of substances that are no longer considered to be VOC's under EPA's definition in §51.100.

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Notably, unlike some of the other substances that the EPA has excluded from their VOC definition, HFC-227ea is not an ozone depleting substance. EPA's prompt action on our request will therefore encourage further reduction in the use of ozone depleting substances. Thank you for giving timely consideration of our request. Please let me know if you have any questions or need additional information concerning our request.

Sincerely,

Robert C. Campbell
Mgr., TSCA Compliance
765-497-6173 (direct)
765-497-6303 (fax)

cc: D. Register (n/encl.)
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